

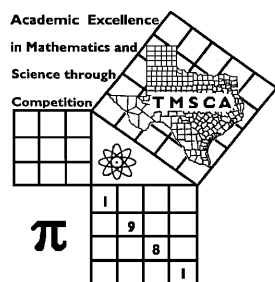
1st Score: _____	2nd Score: _____	3rd Score: _____	_____. ____ <b>Final Score</b>
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

## PLACE LABEL BELOW

Name: \_\_\_\_\_ School: \_\_\_\_\_

SS/ID Number: \_\_\_\_\_ City: \_\_\_\_\_

Grade: 4 5 6 7 8                      Classification: 1A 2A 3A 4A 5A 6A



## TMSCA MIDDLE SCHOOL CALCULATOR STATE TEST © APRIL 27, 2019

### GENERAL DIRECTIONS

**I. About this test:**

- A. You will be given 30 minutes to take this test. There are 80 problems on this test.
- B. ALL calculators must be cleared. HP Prime and Casio Prizm calculators are NOT permitted.**

**II. How to write the answers:**

- A. For all problems except stated problem as noted below write three significant digits.
  - 1. Examples (\* means correct, but not recommended)  
 Correct: 12.3, 123, 123.\*, 1.23x10\*, 1.23x10<sup>0\*</sup>, 1.23x10<sup>1</sup>, 1.23x10<sup>01</sup>, .0190, 1.90x10<sup>-2</sup>  
 Incorrect: 12.30, 123.0, 1.23(10)<sup>2</sup>, 1.23·10<sup>2</sup>, 1.230x10<sup>2</sup>, 1.23\*10<sup>2</sup>, 0.19, 1.9x10<sup>-2</sup>, 19.0x10<sup>-3</sup>, 1.90E-02
  - 2. Plus or minus one digit error in the third significant digit is permitted.
- B. For stated problems:
  - 1. Except for integer, dollar sign, and significant digit problems, as detailed below, answers to stated problems should be written with three significant digits.
  - 2. Integer problems are indicated by (integer) in the answer blank. Integer problems answers must be exact, no plus or minus one digit, no decimal point or scientific notation.
  - 3. Dollar sign (\$) problems should be answered to the exact cent, but plus or minus one cent error is permitted. The decimal point and cents are required for exact dollar answers.

**III. Some symbols used on the test.**

- A. Angle measure: rad means radians; deg means degrees.
- B. Inverse trigonometric functions: arcsin for inverse sine, etc.
- C. Special numbers: π for 3.14159 . . . ; e for 2.71828.
- D. Logarithms: Log means common (base 10); Ln means natural (base e).

**IV. Scoring:**

- A. All problems answered correctly are worth FIVE points. FOUR points will be deducted for all problems answered incorrectly or skipped before the last problem attempted.

**2018-2019 TMSCA Middle School Calculator State Meet**

1.  $3070 - 2670$  ----- 1= \_\_\_\_\_
2.  $38 + 16 + 5$  ----- 2= \_\_\_\_\_
3.  $-128 + 17 + 138$  ----- 3= \_\_\_\_\_
4.  $30 + 14 + 16 + 34$  ----- 4= \_\_\_\_\_
5.  $275 - 29 - 280 - 250$  ----- 5= \_\_\_\_\_
6.  $-212 - 139 - 241 + 151 + 80.3$  ----- 6= \_\_\_\_\_
7.  $(0.942 - 0.307) + (0.776 - 0.632 - 0.478)$  ----- 7= \_\_\_\_\_
8.  $0.834 + 0.408 - 2.4 + 2.11 + 2.88$  ----- 8= \_\_\_\_\_
9.  $307 \times 418 \times 99.5$  ----- 9= \_\_\_\_\_
10.  $1010 \times 166 \times 110 \times 1890$  ----- 10= \_\_\_\_\_
11. Calculate the mean of the fifth root of twenty, eight percent of one million, pi to the sixth power, and the additive inverse of the natural log of 95. ----- 11= \_\_\_\_\_
12. On a square foot grid a right triangle has vertices at (1,4), (1,-3), and (7,-3). Calculate the number of square yards needed to cover this triangle. ` ----- 12= \_\_\_\_\_ yds.<sup>2</sup>
13. The width of a rectangle is 25% less than the length. If the perimeter of the rectangle is 825 in., calculate the width of the rectangle in inches. ----- 13= \_\_\_\_\_ in.

14.  $(311)[270 \times 280 \times 398]$  -----14= \_\_\_\_\_

15.  $(802/470)[433 - 666]$  -----15= \_\_\_\_\_

16.  $\{(50)(35 - 79)(188)\} - 1.70 \times 10^5$  -----16= \_\_\_\_\_

17.  $\left[\frac{95}{102}\right][(154/16) - 9.49]$  -----17= \_\_\_\_\_

18.  $\frac{[434/(790)]/0.267}{(0.00261 \times 0.00163)(0.0399)}$  -----18= \_\_\_\_\_

19.  $\frac{(64/72) + (60/106)}{(0.78 - 0.382)}$  -----19= \_\_\_\_\_

20.  $\frac{(\pi)(4/7)(11/8)}{69}$  -----20= \_\_\_\_\_

21.  $\frac{44}{(71 - 28)} - \frac{(162 - 234)}{102}$  -----21= \_\_\_\_\_

22.  $\left[\frac{671 + 2520}{4230 - 2180}\right] \left[\frac{1250}{5560}\right]$  -----22= \_\_\_\_\_

23.  $\frac{(0.944 + 1.56 - 0.799)}{\{(0.0303 - 0.0272)/(0.0958)\}}$  -----23= \_\_\_\_\_

24. There are three consecutive even integers such that the sum of the first and second is equal to the sum of the third and negative ten. Calculate the value of the largest integer. -----24= \_\_\_\_\_ INT.

25. A square has an area of 872 sq. cm. This square is inscribed in a circle. Calculate the area of the circle in square cm. -----25= \_\_\_\_\_ cm<sup>2</sup>

26. Calculate the positive difference between the measure of an interior angle of a regular dodecagon and that of a regular pentagon. -----26= \_\_\_\_\_

27.  $\frac{(2.19 \times 10^7) + (1.60 \times 10^8)}{(-0.316)(0.258) - 0.0174}$  -----27= \_\_\_\_\_

28.  $(0.00231)[(0.00158/0.00583)(0.0167 + 0.00848)]$  -----28= \_\_\_\_\_

29.  $[1930 - (579 + 1870)] + [(12)(1120 - 1160)]$  -----29= \_\_\_\_\_

30.  $\frac{(75.6 + 28.6)}{(2.67 \times 10^{11})}$  -----30= \_\_\_\_\_

31.  $\frac{1}{0.0647} + \frac{1}{(\pi)(0.0733 - 0.0337)}$  -----31= \_\_\_\_\_

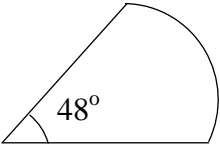
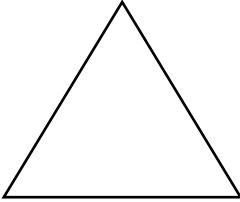
32.  $(6.15) \left[ \frac{0.0508}{(9.67 \times 10^{11})} \right]$  -----32= \_\_\_\_\_

33.  $\left[ \frac{1/1430}{1/3210} \right] [4.47 \times 10^5]$  -----33= \_\_\_\_\_

34.  $\frac{1}{46.7} - \frac{1}{(15.5 + 64.8)}$  -----34= \_\_\_\_\_

35. Calculate the value of 402 Base 6 plus 535 Base 6 in Base 10. ----35= \_\_\_\_\_ INT.

36. Calculate  $721(672)^{202}$ . -----36= \_\_\_\_\_

SECTOR OF A CIRCLE	EQUILATERAL TRIANGLE
	
Perimeter = 65	Perimeter = 27.4
Area = ?	Area = ?
37= _____	38= _____

39.  $(0.0749 + 0.548 + 0.711)^2(2.28 + 1.53)^2$  -----39= \_\_\_\_\_

40.  $\left[\frac{519}{0.649}\right](0.736 + 2.72)^2$  -----40= \_\_\_\_\_

41.  $\sqrt{\frac{164 + 221}{1340 - 413}}$  -----41= \_\_\_\_\_

42.  $\sqrt{(246/93.3) + 1.85 - 0.801}$  -----42= \_\_\_\_\_

43.  $(18200)\sqrt{544 + 250 + 248}$  -----43= \_\_\_\_\_

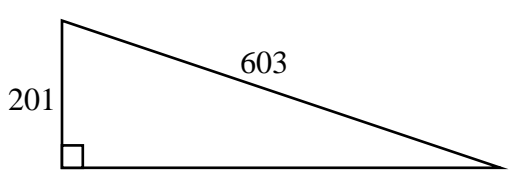
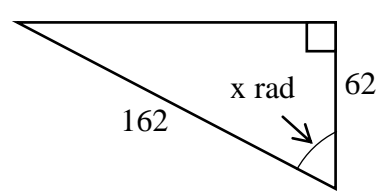
44.  $(1/(0.0016))(26500 - 4530)^2$  -----44= \_\_\_\_\_

45.  $\sqrt{1.1 - 145/380} + 1/\sqrt{1.71 + 0.558}$  -----45= \_\_\_\_\_

46.  $\frac{1}{\sqrt{148 + 67.6 + 162}} + \left(\frac{1}{\sqrt{3.44}}\right)^3$  -----46= \_\_\_\_\_

47. Calculate the length of the longest diagonal in a regular octagon with a side length of 101 inches. -----47= \_\_\_\_\_ in.

48. Ann completed all the problems on her TMSCA calculator test through number 72. When she got her score back it was only 162. Calculate how many she got incorrect. -----48= \_\_\_\_\_ INT.

<p style="text-align: center;"><b>RIGHT TRIANGLE</b></p>  <p style="text-align: right;">Area = ?</p> <p>49= _____</p>	<p style="text-align: center;"><b>RIGHT TRIANGLE</b></p>  <p style="text-align: center;">x = ?</p> <p>50= _____</p>
--	---

51.  $\sqrt{\frac{4.57 \times 10^{11}}{(20.4)(611)}} + \frac{(1.95 \times 10^5 - 1.21 \times 10^5)}{(6.52 + 3.33)}$  -----51=\_\_\_\_\_

52.  $\frac{(6030 + 5820 - 18500)^3}{\sqrt{3.61 + 1.68 + 2.29}}$  -----52=\_\_\_\_\_

53.  $\left[ \frac{98.6 - 33.4 + \sqrt{1.23 \times 10^5 / 45.3}}{-67.4 + 196} \right]^3$  -----53=\_\_\_\_\_

54.  $\sqrt{\frac{(17900)(24600)}{(53600)(22000)}} - 0.425 + 0.442$  -----54=\_\_\_\_\_

55.  $(193)(3.73 \times 10^9)^{1/2} - [(7.95 \times 10^9)(4.36 \times 10^{10})]^{1/3}$  -----55=\_\_\_\_\_

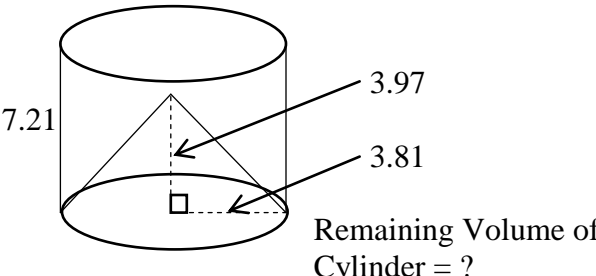
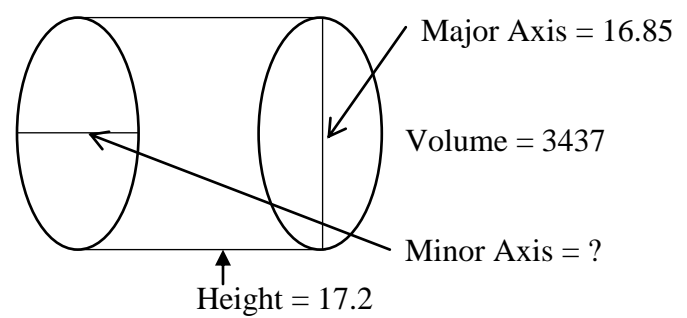
56.  $0.154 + \sqrt{(253)/(466)} - (0.611 + 0.566)^2$  -----56=\_\_\_\_\_

57.  $\sqrt{\frac{1/(76.4 - 27.7)}{(9.93)(414 + 130)^5}}$  -----57=\_\_\_\_\_

58.  $(\text{rad}) \tan(284) + (333/207)$  -----58=\_\_\_\_\_

59. Teri wants to fill his pool. The garden hose will fill it in 15 hours. He got the fire department to use the fire hydrant and filled the pool in 3 hours. Calculate the time, in hours, it would take if both hoses were used. -----59=\_\_\_\_\_ hrs.

60. Standard Texas license plates are formed by three letters A – Z followed by four numbers, 0 – 9. Calculate the number of plates that can be made if repetition is allowed. -----60=\_\_\_\_\_

<p style="text-align: center;"><b>CYLINDER WITH A CONE INDENT</b></p>  <p style="text-align: right;">Remaining Volume of Cylinder = ?</p> <p>61= _____</p>	<p style="text-align: center;"><b>RIGHT ELLIPTICAL SOLID</b></p>  <p style="text-align: right;">Minor Axis = ?</p> <p>62= _____</p>
---	---

63.  $\frac{25!/16!}{20! + 19!}$  ----- 63= \_\_\_\_\_

64. (deg)  $(28800 + 31200)\cos(37.1^\circ)$  ----- 64= \_\_\_\_\_

65. (deg)  $\frac{\sin(106^\circ)}{323}$  ----- 65= \_\_\_\_\_

66. (rad)  $\frac{\sin(107)}{1160/3110}$  ----- 66= \_\_\_\_\_

67. (rad)  $\tan\left[\frac{(1.14)(\pi)}{(88.8)(20.2)}\right]$  ----- 67= \_\_\_\_\_

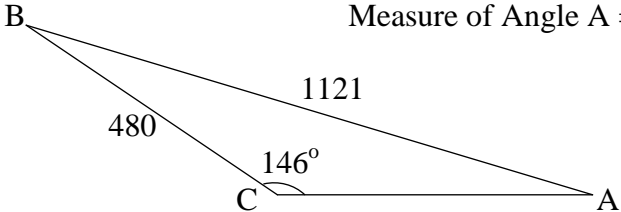
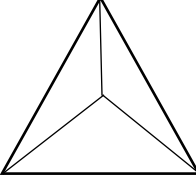
68. (deg)  $\frac{\sin(198^\circ)}{841 + 2240}$  ----- 68= \_\_\_\_\_

69. (deg)  $\frac{\sin(0.864^\circ) - \tan(0.864^\circ)}{\sin(0.864^\circ)}$  ----- 69= \_\_\_\_\_

70.  $(1680 - 1300)^{0.0713} - 0.0468$  ----- 70= \_\_\_\_\_

71. A jar of marbles has 7 blue, 5 yellow, 1 white, and 12 red. Calculate the probability of drawing a blue and then a white if the first marble drawn is replaced. ----- 71= \_\_\_\_\_

72. Philip took his car to the shop. Two mechanics go to work on his car. One mechanic can complete the job in 6 hours. Her trainee can complete the job in 8 hours. They work together for the first two hours then she let the trainee complete the job. Calculate the time it takes the trainee to complete the job. ----- 72= \_\_\_\_\_ hrs.

SCALENE TRIANGLE	TETRAHEDRON
<p>Measure of Angle A = ?</p> 	 <p>Volume = 8721</p> <p>Edge = ?</p>
73= _____	74= _____

75.  $\frac{\text{Log}(112 + 111)}{4240 - 632}$  ----- 75= \_\_\_\_\_

76.  $\frac{(41.5)^{0.478}(2.6)^{0.735}}{(32.1 - 16.9)^{-12}}$  ----- 76= \_\_\_\_\_

77.  $2\text{Log}\sqrt{\frac{(249)(3.15)}{91.4 + 86.9}}$  ----- 77= \_\_\_\_\_

78.  $\frac{(e^{0.659})(e^{0.621})(e^{0.177})}{\text{Ln}(59.8 + 62.2)}$  ----- 78= \_\_\_\_\_

79.  $2 + 4 + 6 + \dots + 744$  ----- 79= \_\_\_\_\_

80.  $(0.68) - \frac{(0.68)^2}{2} + \frac{(0.68)^3}{3} - \frac{(0.68)^4}{4}$  ----- 80= \_\_\_\_\_



## 2018-2019 TMSCA Middle School Calculator State Meet Answer Key

Page 1	Page 2	Page 3	Page 4
1 = 400 = $4.00 \times 10^2$	14 = $9.36 \times 10^9$	27 = $-1.84 \times 10^9$	39 = 25.8 = $2.58 \times 10^1$
2 = 59.0 = $5.90 \times 10^1$	15 = -398 = $-3.98 \times 10^2$	28 = $1.58 \times 10^{-5}$	40 = 9550 = $9.55 \times 10^3$
3 = 27.0 = $2.70 \times 10^1$	16 = -584000 = $-5.84 \times 10^5$	29 = -999 = $-9.99 \times 10^2$	41 = 0.644 = $6.44 \times 10^{-1}$
4 = 94.0 = $9.40 \times 10^1$	17 = 0.126 = $1.26 \times 10^{-1}$	30 = $3.90 \times 10^{-10}$	42 = 1.92 = $1.92 \times 10^0$
5 = -284 = $-2.84 \times 10^2$	18 = $1.21 \times 10^7$	31 = 23.5 = $2.35 \times 10^1$	43 = 587000 = $5.87 \times 10^5$
6 = -361 = $-3.61 \times 10^2$	19 = 3.66 = $3.66 \times 10^0$	32 = $3.23 \times 10^{-13}$	44 = $3.02 \times 10^{11}$
7 = 0.301 = $3.01 \times 10^{-1}$	20 = 0.0358 = $3.58 \times 10^{-2}$	33 = $1.00 \times 10^6$	45 = 1.51 = $1.51 \times 10^0$
8 = 3.83 = $3.83 \times 10^0$	21 = 1.73 = $1.73 \times 10^0$	34 = 0.00896 = $8.96 \times 10^{-3}$	46 = 0.208 = $2.08 \times 10^{-1}$
9 = $1.28 \times 10^7$	22 = 0.350 = $3.50 \times 10^{-1}$		
10 = $3.49 \times 10^{10}$	23 = 52.7 = $5.27 \times 10^1$	35 = 349 INT.	47 = 264 = $2.64 \times 10^2$
11 = 20200 = $2.02 \times 10^4$	24 = -4 INT.	36 = $9.69 \times 10^{573}$	48 = 22 INT.
12 = 2.33 = $2.33 \times 10^0$	25 = 1370 = $1.37 \times 10^3$	37 = 220 = $2.20 \times 10^2$	49 = 57100 = $5.71 \times 10^4$
13 = 177 = $1.77 \times 10^2$	26 = 42.0 = $4.20 \times 10^1$	38 = 36.1 = $3.61 \times 10^1$	50 = 1.18 = $1.18 \times 10^0$

## 2018-2019 TMSCA Middle School Calculator State Meet Answer Key

### Page 5

$$\begin{aligned} 51 &= 13600 \\ &= 1.36 \times 10^4 \\ 52 &= -1.07 \times 10^{11} \\ 53 &= 0.759 \\ &= 7.59 \times 10^{-1} \\ 54 &= 0.628 \\ &= 6.28 \times 10^{-1} \\ 55 &= 4.76 \times 10^6 \\ 56 &= -0.494 \\ &= -4.94 \times 10^{-1} \\ 57 &= 6.59 \times 10^{-9} \\ 58 &= 4.69 \\ &= 4.69 \times 10^0 \\ 59 &= 2.50 \\ &= 2.50 \times 10^0 \\ 60 &= 1.76 \times 10^8 \end{aligned}$$

### Page 6

$$\begin{aligned} 61 &= 268 \\ &= 2.68 \times 10^2 \\ 62 &= 15.1 \\ &= 1.51 \times 10^1 \\ 63 &= 2.90 \times 10^{-7} \\ 64 &= 47900 \\ &= 4.79 \times 10^4 \\ 65 &= 0.00298 \\ &= 2.98 \times 10^{-3} \\ 66 &= 0.495 \\ &= 4.95 \times 10^{-1} \\ 67 &= 0.00200 \\ &= 2.00 \times 10^{-3} \\ 68 &= -0.000100 \\ &= -1.00 \times 10^{-4} \\ 69 &= -0.000114 \\ &= -1.14 \times 10^{-4} \\ 70 &= 1.16 \\ &= 1.16 \times 10^0 \\ 71 &= 0.0112 \\ &= 1.12 \times 10^{-2} \\ 72 &= 3.33 \\ &= 3.33 \times 10^0 \end{aligned}$$

### Page 7

$$\begin{aligned} 73 &= 13.9 \\ &= 1.39 \times 10^1 \\ 74 &= 42.0 \\ &= 4.20 \times 10^1 \\ 75 &= 0.000651 \\ &= 6.51 \times 10^{-4} \\ 76 &= 1.82 \times 10^{15} \\ 77 &= 0.643 \\ &= 6.43 \times 10^{-1} \\ 78 &= 0.894 \\ &= 8.94 \times 10^{-1} \\ 79 &= 139000 \\ &= 1.39 \times 10^5 \\ 80 &= 0.500 \\ &= 5.00 \times 10^{-1} \end{aligned}$$

**11.**

$$\frac{\sqrt[5]{20} + .08(1,000,000) + \pi^6 - \ln 95}{4}$$

**12.** The legs of the triangle are 7 feet and 6 feet. The area is

$$\frac{(7)(6)}{2} = 21 \text{ ft}^2$$

$$1y^2 = 9ft^2 \text{ so area} = \frac{21}{9} yd^2$$

**13.**  $L = \text{length};$

$$.75L = \text{width}$$

$$825 = 2L + 2(.75L)$$

$$L = \frac{825}{3.5}; W = .75 \left( \frac{825}{3.5} \right)$$

**24.**  $x = 1^{\text{st}}, x+2 = 2^{\text{nd}},$

$$x+4 = 3^{\text{rd}}$$

$$x + x + 2 = x + 4 - 10$$

$$x = -8; x + 4 = -4$$

**25.**  $(\text{side})\sqrt{2} = \text{diagonal of square} = \text{diameter of circle.}$

$$\text{Diagonal of square} = (\sqrt{872})\sqrt{2}$$

$$\text{Radius} = \frac{(\sqrt{872})\sqrt{2}}{2}$$

$$\text{Area of circle} = \pi \left[ \frac{(\sqrt{872})\sqrt{2}}{2} \right]^2$$

**26.** A good way to find n interior angle of any polygon is  $180 - \frac{360}{n}$ .

(This is because the exterior angle formula is  $\frac{360}{n}$  and it is

supplementary to the interior angle.

$$\left( 180 - \frac{360}{12} \right) - \left( 180 - \frac{360}{5} \right)$$

$$\mathbf{35.} 402_6 + 535_6 = 1341_6 = 1(6^3) + 3(6^2) + 4(6) + 1$$

**36.** 721 will be multiplied at the end.

**672**<sup>202</sup> Punch 202

672

**36. contd.**

*(Look at the digits to the left of the decimal. This gives 571 for the exponent. Write down 571.)* Punch

$$571 \quad \boxed{-} \quad \boxed{10^x}$$

*(This gives 1.34 E0. Now multiply 1.34 times 721. You get 9.69 E2. So the answer is  $9.69 \times 10^{571+2} = 9.69 \times 10^{573}$*

$$\mathbf{37.} \frac{48}{360} [2\pi r] + 2r = 65$$

$$r \left[ \frac{48}{360} (2\pi) + 2 \right] = 65$$

$$\text{So } r = \frac{65}{\frac{48}{360}(2\pi)+2}$$

$$\text{Area} = \frac{48}{360} \left( \pi \left[ \frac{65}{\frac{48}{360}(2\pi)+2} \right]^2 \right)$$

$$\mathbf{38.} \text{ Side} = \frac{27.4}{3}$$

$$\text{Area} = \frac{\left( \frac{27.4}{3} \right)^2 \sqrt{3}}{4}$$

**47.** For an even number of sides, longest diagonal is

$$\frac{\text{side}}{\sin \frac{180}{n}} = \frac{101}{\sin \frac{180}{8}}$$

$$\mathbf{48.} 72(5) - 9x = 162$$

$$x = \frac{162-360}{-9}$$

$$\mathbf{49.} \text{ base} = \sqrt{603^2 - 201^2}$$

$$\text{Area} = \frac{1}{2} (\sqrt{603^2 - 201^2})(201)$$

**50.** Change to radians.

$$\frac{\cos x}{1} = \frac{62}{162}; \text{acos} \left( \frac{62}{162} \right)$$

$$\mathbf{59.} \frac{15(3)}{15+3}$$

$$\mathbf{60.} 26^3 \cdot 10^4$$

**61.** The cone and cylinder have different heights.

$$\pi r^2 h_1 - \frac{1}{3} \pi r^2 h_2 =$$

$$\pi 3.81^2 (7.21) - \frac{1}{3} \pi 3.81^2 (3.97)$$

**62.** Volume = Bh where B is the area of the ellipse.

$x = \text{minor axis. Volume} =$

$$\pi \left( \frac{16.85}{2} \right) \left( \frac{x}{2} \right) (17.2) = 3437$$

$$x = \frac{3437(2)(2)}{16.85\pi(17.2)}$$

$$\mathbf{71.} \frac{7}{25} \cdot \frac{1}{25}$$

**72.** wr= work rate or amount done in 1 hour; t= hours; wd= part of the work done.

	wr	t	wd
Mech	$\frac{1}{6}$	2 hrs	$\frac{1}{3}$
Train	$\frac{1}{8}$	2 hrs	$\frac{1}{4}$

In 2 hours they have finished

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12} \text{ of the job. They have } \frac{5}{12} \text{ left to do. } \frac{1}{8} x = \frac{5}{12}; x = \frac{5}{12} (8)$$

$$\mathbf{73.} \frac{\sin 146}{1121} = \frac{\sin A}{480}$$

$$A = \text{asin} \left[ \frac{(\sin 146)(480)}{1121} \right]$$

$$\mathbf{74.} V = \frac{e^3}{6\sqrt{2}} = 8721$$

$$e = \sqrt[3]{(8721)(6\sqrt{2})}$$